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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/552,263	09/12/2006	Frank Duvinage	095309.56876US	6775
23911 7590 09/13/2011 CROWELL & MORING LLP INTELLECTUAL PROPERTY GROUP P.O. BOX 14300 WASHINGTON, DC 20044-4300			EXAMINER NGUYEN, TU MINH	
			ART UNIT 3748	PAPER NUMBER
			MAIL DATE 09/13/2011	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

10/552,263

**Applicant(s)**

DUVINAGE ET AL.

**Examiner**

TU NGUYEN

**Art Unit**

3748

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 June 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on \_\_\_\_; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 5) ☒ Claim(s) 15-19, 25-34, 38, 39, 44 and 45 is/are pending in the application.
- 5a) Of the above claim(s) 25-31 is/are withdrawn from consideration.
- 6) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 7) ☒ Claim(s) 15-19, 32-34, 38, 39, 44 and 45 is/are rejected.
- 8) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 9) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 05 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

### DETAILED ACTION

1. An Amendment filed on June 27, 2011 has been entered. Claims 42 and 43 have been canceled; and claims 15 and 32 have been amended. Overall, claims 15-19, 25-34, 38, 39, 44, and 45 are pending in this application.

Based on a previous applicant's election without traverse of the species of Figure 1, claims 15-19, 32-34, 38, 39, 44, and 45 are readable thereon and will be examined in their full merit. Claims 25-31 are withdrawn from further consideration as being drawn to a non-elected invention.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 15, 16, 19, 32-34, 38, 39, 44, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stanglmaier et al. (U.S. Patent 6,732,507) in view of Stroia et al. (U.S. Patent 6,745,560) and Kirwan et al. (U.S. Patent 6,655,130).**

Re claims 15 and 32, as shown in the Figure, Stanglmaier et al. disclose an exhaust gas aftertreatment device for a motor vehicle and a method for operating said device, the device comprising:

- a particulate filter (40) being arranged directly, in a full flow of exhaust gas, in a main exhaust gas stream (16) of an internal combustion engine, whereby residual oxygen that is necessary for combusting particulate matter is derived from exhaust gas;

- an NO<sub>x</sub> storage catalytic converter (20) arranged in the main exhaust gas stream downstream of the reforming unit, the NO<sub>x</sub> storage catalytic converter being operable to remove NO<sub>x</sub> from lean exhaust gas by storing NO<sub>x</sub> as the lean exhaust gas flows through the NO<sub>x</sub> storage catalytic converter, and to generate N<sub>2</sub> by reducing the stored NO<sub>x</sub> when reducing exhaust gas flows through the NO<sub>x</sub> storage catalytic converter; and

- an SCR catalytic converter (30) arranged in the main exhaust gas stream downstream of the NO<sub>x</sub> storage catalytic converter, the SCR catalytic converter being operable to reduce NO<sub>x</sub> contained in the exhaust gas using NH<sub>3</sub> that has been generated by the NO<sub>x</sub> storage catalytic converter (see lines 29-54 of column 4).

Stanglmaier et al., however, fail to disclose that the particulate filter comprises a reforming unit configured as an autothermal reforming reactor that generates hydrogen by at least one of steam reforming and partial oxidation of hydrocarbons from a secondary injection device arranged upstream of the reforming unit, whereby hydrogen is used to reduce NO<sub>x</sub> in exhaust gas by way of the NO<sub>x</sub> storage catalytic converter; and that the method further comprises supplying reformat to the engine by way of an exhaust gas recirculation operably arranged between the reforming unit and the NO<sub>x</sub> storage catalytic converter.

As shown in Figure 4, Stroia et al. disclose an adsorber after-treatment system having dual soot filters, comprising a particulate filter (18a) and a NO<sub>x</sub> storage catalytic converter (26). As indicated on lines 13-18 of column 8, Stroia et al. teach that it is conventional in the art to

include a catalyst in the particulate filter such that the filter, operable as a reforming unit, is adapted to generate hydrogen from the partial oxidation of a HC fuel from a secondary injection device (30, 36) arranged upstream of the reforming unit being operable for post-engine introduction of a fuel into the exhaust stream upstream of the reforming unit, to reduce NO<sub>x</sub> in an exhaust gas stream by way of the NO<sub>x</sub> storage catalytic converter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the particulate filter taught by Stroia et al. in the device and method of Stanglmaier et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to improve a NO<sub>x</sub> purification efficiency of the NO<sub>x</sub> storage catalytic converter.

As shown in Figure 1, Kirwan et al. disclose a system for near zero cold start tailpipe emissions in internal combustion engines, comprising an on-board fuel reforming unit (12) and a catalyst (24) located downstream of an internal combustion engine (20). As illustrated in Figure 4 and indicated on line 59 of column 4 to line 5 of column 5, Kirwan et al. teach that it is conventional in the art to supply a reformat gas produced by the reforming unit to the engine by way of an exhaust gas recirculation operably arranged between the reforming unit and the catalyst in order to minimize a release of harmful HC and NO<sub>x</sub> emissions into the atmosphere during an engine cold-start. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Kirwan et al. in the modified device and method of Stanglmaier et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to reduce harmful emissions in an exhaust gas stream during an engine cold-start.

Re claim 16, as shown as device (40) and indicated on lines 15-23 of column 5, the modified device of Stanglmaier et al. further comprises an oxidation catalytic converter that is arranged downstream of the SCR catalytic converter.

Re claim 19, in the modified device of Stanglmaier et al., the reforming unit (40) comprises a catalytically active particulate filter.

Re claims 33-34, as taught by Stroia et al., the modified method of Stanglmaier et al. further comprises setting the temperature of the reforming unit by an air-fuel ratio and determining oxygen concentration in the exhaust gas using a wide-band lambda sensor (20), wherein the reforming unit is operated at an air-fuel ratio in the range from approximately  $0.5 < \lambda < 1.0$ .

Re claims 44-45, in the modified device and method of Stanglmaier et al., the main exhaust gas stream flows in a single flow path that includes the reforming unit (40), the NOx storage catalytic converter (20), and the SCR catalytic converter (30).

Re claim 38, the modified device of Stanglmaier et al. discloses the invention as cited above, however, fails to disclose that the device further comprises a catalytic converter arranged closed to the engine.

Since applicant fails to challenge the examiner's official notice that it is well known to those with ordinary skill in the art that Stanglmaier et al. further comprise a catalytic converter arranged closed to the engine in order to purify exhaust gas when the engine is during a cold-start period, it is therefore assumed that applicant has acquiesced with the examiner on such features or limitations.

Re claim 39, the modified device of Stanglmaier et al. discloses the invention as cited above, however, fails to disclose that the NO<sub>x</sub> storage catalytic converter is configured to generate NH<sub>3</sub> by reduction of accumulated NO<sub>x</sub> with H<sub>2</sub>.

Since applicant fails to challenge the examiner's official notice that it is well known to those with ordinary skill in the art that the NO<sub>x</sub> storage catalytic converter in Stanglmaier et al. is adapted to generate NH<sub>3</sub> by reduction of accumulated NO<sub>x</sub> with H<sub>2</sub>, it is therefore assumed that applicant has acquiesced with the examiner on such features or limitations.

**4. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stanglmaier et al. in view of Stroia et al. and Kirwan et al. as applied to claims 16 and 15, respectively, above, and further in view of Murachi et al. (U.S. Patent 5,746,989).**

The modified device of Stanglmaier et al. discloses the invention as cited above, however, fails to disclose that the device further comprises a three-way catalytic converter that is arranged immediately downstream of the reforming unit.

As shown in Figure 1, Murachi et al. disclose a system for purifying exhaust gas of an internal combustion engine, comprising a NO<sub>x</sub> storage catalytic converter (9) and a three-way catalytic converter (TWC) located upstream of the NO<sub>x</sub> storage catalytic converter (9). As indicated on lines 7-19 and 37-48 of column 5, Murachi et al. teach that it is conventional in the art to utilize the TWC to convert NO in a lean exhaust gas stream into NO<sub>2</sub> such that NO<sub>2</sub> is further oxidized by the NO<sub>x</sub> catalytic converter into NO<sub>3</sub> which is then adsorbed by the NO<sub>x</sub> catalytic converter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the TWC taught by Murachi et al. in the modified device and method of Stanglmaier et al., since the use thereof would have been routinely

practiced by those with ordinary skill in the art to improve a NOx purification efficiency of the NOx storage catalytic converter.

***Response to Arguments***

5. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are moot in view of the new ground(s) of rejection.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.



***Prior Art***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of one patent: Liu et al. (U.S. Patent 6,964,156) further disclose a state of the art.

***Communication***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN  
September 9, 2011

/Tu M. Nguyen/  
Tu M. Nguyen  
Primary Examiner  
Art Unit 3748